

NTU MOLECULAR IMAGING SEMINAR

3D quantitative phase imaging techniques for non-invasive label-free imaging of cells and tissues

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Quantitative phase imaging (QPI) has emerged as an invaluable tool for imaging small transparent objects, such as biological cells and tissues. QPI employs various interferometric microscopy techniques to quantitatively measure the optical phase delay of samples. In particular, the measured optical phase delay provides information about the morphological and biochemical properties of biological samples at the single-cell level. Recently, QPI techniques have been widely applied to study the pathophysiology of various biological cells and tissues, including red blood cells (RBCs), white blood cells, bacteria, neurons, and cancer cells.

In this talk, I will present the recently developed 3-D holotomography setup using a dynamic mirror device, which is an optical analogous to X-ray computed tomography. In particular, I will discuss the visualization of 3D refractive index distributions of biological cells and tissues measured with the 3-D holotomography using the transfer function method, which has been widely used in the visualization field. The outcome demonstrates outstanding visualization of 3D refractive index maps of live cells, which will be potentially used in various applications in biology and medicine. I will also discuss about the commercialization of the technique.

References

[1] Shin S, Kim K, Yoon J, Park YK, Optics Letters, 40, 5407-5410 (2015).

主辦
單位



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